PART 1 - GENERAL

1.1 DESCRIPTION:

A. General:

All applicable provisions of the General Conditions, the Supplementary General Conditions and Division 1 shall apply to all work of this Section.

B. Scope: The work to be done shall, in general, consist of the following major items. (Minor work, work incidental to or arising from other parts of this work, may not be listed hereunder but shall be included as may be necessary for the full completion of the job.) Furnishing and erecting, placing or setting of:

1. Columns with base plates, anchor bolts, beams with bearing plates, anchors.

2. Shop fabricated steel trusses.

3. Standards and special connections, including angles, plates, high-strength bolts.

4. Steel lintels, support angles, plates, bolts, etc., as shown on Structural Drawings and details and all structural members as defined in Section 2, AISC "Code of Standard Practice".

5. Delivery of anchor bolts and templates to the site for installation by others. Angle straps welded to beams to support masonry.

6. Welding where required.

7. All shop and field drilling, punching and cutting shown on the drawings and/or specified for mechanical, electrical and other work.

8. Shop painting, field touch-up and field coat painting.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Cast-in-Place Concrete, Section 03300.

B. Steel Deck, Section 05310.

C. Field painting of exposed structural steel is specified in "Painting" Section.

D. Setting of anchors, bolts, grouting of base plates and bearing plates is specified in "Cast-in-Place Concrete" Section.

E. Setting loose lintels weighing less than 200 lbs. is specified in "Unit Masonry" Section.

F. Supplementary steel for support of mechanical and electrical work, except as specifically shown and specified otherwise, is specified in Division 15 and 16.

1.3 GENERAL REQUIREMENTS:

A. All work of this Section shall be provided in accordance with AISC "Code o Standard Practice for Steel Buildings and Bridges", latest edition.

B. Erection of structural steel shall be in accordance with Occupational Safety and Health Act, and the Construction Safety Act.

C. Examine all drawings and data and coordinate the work of this Section with all related and adjoining work.

1.4 SUBMITTALS:

A. Submit for review prior to fabrication or purchase, shop drawings showing the kind of material, sizes of members, details or pieces worked out with due reference to their position, framing, openings, method of securing same together, erection plans, anchor bolt plans, and proper execution of the work in connection with other trades.

1. Where the required data for attaching materials to structural steel is not shown on design drawings, Contractor shall obtain information from the Architect before submitting shop drawings.

2. Review of shop drawings will be for sizes and shapes of main and secondary members only.

3. Review of shop drawings will not cover detailed fabricating dimensions. Any errors in dimensions on shop drawings are the responsibility of the Contractor.

B. Submit mill test reports and shipping documents if requested by the Owner.

C. Submit for review, qualifications of welders performing shop and field welding.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural steel shall conform to ASTM A36, and other steels as approved by the Engineer. Tubular columns to be ASTM A500 Grade B (Fy=46 k.s.i.).

B. All bolts shall conform to ASTM325 unless noted otherwise on the drawings.

1. Bolts for steel connections shall be of lengths required, with smooth or ribbed surfaces the full length of the grip. Unfinished bolts shall be fitted with self-locking nuts or with lock washers and plain nuts.

2. High-strength bolts, including nuts and washers, shall comply with ASTM A325. These bolts shall be identified by markings on top of the bolt head. Minimum dimensions for bolts, washers, beveling, etc. shall comply with requirements of the “Specifications for Structural Joints using ASTM A325 Bolts” as issued by the Research Council on Structural Connections of the Engineering Foundation.

C. Arc welding electrodes shall conform to ASTM Standard Specifications A233. Electrodes shall be of proper classification numbers.

D. Shop coat of paint shall be zinc oxide conforming to Primer specifications as listed in Steel Structures Painting Council Paint System Specifications.

1. Structural steel which is scheduled to be encased in concrete shall NOT be painted.

E. Self-fireproofed columns shall bear a certified Underwriters Laboratory classification for three (3) hour fire rating.

1. Partial fireproof shells as scheduled and shown on the drawings shall be securely attached and properly fastened to the structural column prior to erection. Partial concrete filler for these columns shall be of the same type as for full F.P. column sections. "U.L." classification for partial F.P. shell columns will not be required.

F. Angles, flats, channels and plates which support the stone facings shall be galvanized after fabrication. Continuous relieving angles supporting stonework shall be galvanized after fabrication.

1. All bolts, nuts, washers, and fasteners required for attachment of stone supports shall be galvanized, cadmium plated, or stainless steel.

2. Field welding of galvanized parts may be required in the field, all such welds shall be completely coated with two (2) coats of Zinc-Rich" paint.

G. Shear connectors for composite beams shall conform to applicable AISC standards and shall be the round headed type connector. Minimum shear capacity per stud shall be 11.3 kips.

PART 3 - EXECUTION

3.1 FABRICATION:

A. All shop fabrication shall conform to Chapter M, AISC Specifications. All members shall be free of twists, kinks, buckles or open joints. Shearing and punching shall be without ragged or torn edges. Holes shall be enlarged only by reaming.

B. All shop connections shall be welded except where otherwise noted.

C. All welding, shop and field, shall be performed only by procedures and welders qualified in accordance with standards for workmanship of American Welding Society "AWS D1.1-88, Structural Welding Code - Steel", as amended to date.

D. No welding shall be done when the temperature is less than 15 degrees F. At temperatures below 35 degrees F. heat area within 3 inches of weld at temperature warm to the hand.

E. Mill bearing ends of columns at right angles to column axis.

F. Column base and cap plates may be shop welded to columns or shipped as separate pieces. Mill to provide satisfactory contact surface.

G. Stresses due to eccentricity to be provided for in all connections and details to keep secondary stresses to a minimum.

H. Where loads are transmitted by direct bearing, set one bearing surface directly over the other in every case. Provide adequate bearing length or stiffeners as required to maintain beam web stresses within allowable limits.

I. Beam and column connections shall follow the Suggested Details, Part 4 of the AISC Steel Manual, unless otherwise permitted.

J. Provide holes for passage of electrical conduit and for all mechanical pipes that otherwise cannot be concealed within the architectural finish, as required by other trades and as authorized by the Engineer, whether or not shown on the drawings.

K. Cambers required for beams and girders shall be mill procedure. Cambers shall not be built into rolled shapes at the fabricators plant without prior written authorization from the Engineer. Camber tolerances shall be per AISC requirements.

L. All beam to beam, beam to girder, and beam to column connections shall be made using DOUBLE ANGLE connections per AISC requirements.

M. All connection of beams to tube columns shall be made with through plate shear connectors. Minimum plate thickness to be 3/8" thick.

3.2 SHOP PAINTING

A. All steel surfaces shall be cleaned by effective means to remove all loose mill scale, loose rust, weld slag, flux deposit, weld splatter, dirt, other foreign material. Mill scale in unbroken bubble form shall be broken and removed; sharp projections shall be ground smooth. Oil and grease shall be removed by solvent in accordance with SSPC-SP-1.

B. All structural steel except steel to be encased in concrete, shall be given one shop coat of paint before shipment in accordance with Chapter M3 of AISC Specifications.

C. Surfaces that are inaccessible after assembly or installation shall be given two (2) shop coats.

D. Omit shop coat of paint from areas required to be field welded of encased in concrete. After erection touch up field connections and welds with same paint as for shop coat.

E. Erection marks shall be painted on shop painted surfaces.

3.3 ERECTION:

A. Erection of steel shall be done in conformance with Section 7 of AISC "Code of Standard Practice".

1. All structural framing shall be accurately set and secured in position.

2. All structural steel work shall be maintained in its position with adequate bracing and guying until all permanent field connections are completed.

3. All steel required to be plumb and level within a tolerance of 1:500, and 1:1000 for exterior columns.

B. All field connections shall be bolted with high strength bolts or welded where specifically indicated on the drawings.

1. High tensile bolts shall be installed with hardened washers. Nuts shall be tightened by the "turn of the nut" method, in conformity with minimum bolt tension values established in the "Specifications for Structural Joints Using ASTM A325 Bolts" as issued by the Research Council on Structural Connections of the Engineering Foundation.

C. Provide anchor bolts for column base plates. Bolts shall be set in concrete under "Case-in-Place Concrete Section.

1. Use leveling nuts and washers with anchor bolts for column base plates.

2. The use of leveling plates will not be permitted.

D. Bearing plates under the ends of beams, girders and columns resting on masonry shall conform to "Standard Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" of the AISC. Leveling plates shall not be permitted.

E. Attached steel lintels, shelf angles, etc., required for support of masonry shall be of size and detail indicated on Drawings and, in the absence of specific detail, shall superimposed loads.

F. Make field changes for improper fit only after Engineer's approval.

3.4 FIELD PAINTING:

A. Touch-up and spot paint all field bolted connection plates, welds and other surfaces where the paint has been rubbed off during the installation with same paint as shop coats, but of different tint or color.

3.5 INSPECTION AND TESTS:

A. Quality control of all shop and field work shall be maintained by the Contractor, including non-destructive testing of certain welds.

B. Testing and inspection of structural steel may be done by a testing agency retained by the Owner. The Owner's testing agency shall have access to all of the Contractor's quality control data. The inspections and possible testing activities of the Owner's agency shall be given full cooperation by the Contractor in shop and field. The Contractor shall supply the Owner's testing agency, if required, free of charge with the following:

1. A complete set of approved erection drawings and shop drawings.

2. Mill test reports, cutting lists, order sheets, bills of materials and shipping bills.

3. Information as to time and place of all rollings and shipment of material to shops.

4. Representative sample pieces requested for testing/

5. Full and ample means and assistance for testing all material and proper facilities, including scaffolding, temporary platforms, etc., for inspection of the work in shop and field.

C. The quality control expected of the Contractor includes inspection of all members for straightness, absence of laminations, etc.,. testing of bolted or welded shop and field work.

1. High-strength bolts shall be tested in accordance with the Research Council Specifications for A325 Bolts. At least one bolt in every connection should be tested . Should any bolt in one connection not test satisfactorily, all bolts in that connection shall be tested.

2. Welding work in shop and field shall be checked in conformance with requirements of the applicable AWS Code in respect to fillet welds. Penetration welds shall be checked 100 percent by a non-destructive method (ultrasonic, radiographic or magnetic particle) approved by the Engineer.

D. In the event that inspections reveal welds, bolts to be undersize, loose or defective, the cost of testing and retesting shall be at the Contractor's expense.

E. Material and workmanship not in conformity with the provisions of this specification will be rejected and remedied by the Contractor at any time defects are found.

END OF SECTION